



# STIC Search Report

## EIC 3700

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### Search Notes

No US or English-language equivalents found for the following Japanese published applications:

JP 9-246794  
JP 8-8600  
JP 8-32299

Attached, you will find machine translated copies for each JP publication.

**WEST****End of Result Set**

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L1: Entry 1 of 3

File: DWPI

Sep 19, 1997

DERWENT-ACC-NO: 1997-519514

DERWENT-WEEK: 199748

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TITLE: Electronic component mounting apparatus - has camera maintenance jig which consists of target hole corresponding to visual field of camera

PRIORITY-DATA: 1996JP-0057470 (March 14, 1996)

PATENT-FAMILY: (1 member)

PUB-NO

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LANGUAGE

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JP 09246794 A

September 19, 1997

006

H05K013/04

INT-CL (IPC): B23 P 19/00; H05 K 13/04; H05 K 13/08

**Patent/ public disclosure document**

**1997246794**

[Abstract(made by the applicant)] [Claims] [Detail Description] [Drawing Description]

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(57)

## [ABSTRACT]

## [PROBLEM TO BE SOLVED]

When, by the *isai* head which comprised camera for substrate recognition unitedly, transfer is equipped with an electronic component of a parts feeder in substrate, provide location detection method of a discharge jet in the electronic packaging equipment which can demand a location as opposed to camera of the discharge jet that vacuum adsorbs an electronic component from precision to beat simply and electronic packaging equipment.

## [SOLUTION]

*isai* head 20 comprises discharge jet 211,212,213 and camera 32 for substrate recognition are installed unitedly. Camera 32 holds jig 35, destination 36 can leave an aperture to jig 35. Pictorial image of destination 36 and discharge jet 211,212,213 is obtained by moving top of recognition unit 5 having line sensor 52 with *isai* head 20. In addition, Pictorial image of destination 36 is obtained with camera 32, if two pictorial image is synthesized, the location that is precision of discharge jet 211,212,213 as opposed to optic axis of camera 32 is demanded.

## [WHAT IS CLAIMED IS:]

## [Claim 1]

In; Positioning department of substrate, The *isai* head which is equipped with transfer in the substrate which vacuum adsorbs an electronic component comprised by a parts feeder to the lower end of a discharge jet, and it is picked up, and was positioned by positioning department, The electronic packaging equipment which comprised a recognition unit installed in underneath of migration road of *isai* head; Electronic packaging equipment including having made jig; comprising: Said *isai* head and camera for substrate recognition unitedly are established, and it is the destination which located with this camera and an above recognition unit in visual field of this camera, and is recognized.

## [Claim 2]

Location detection method of a discharge jet in electronic packaging equipment; wherein; Top of a recognition unit is moved in *isai* head and, a production process to recognize a location of a discharge jet of *isai* head and a destination installed in visual field of camera for the substrate recognition that it is at one with this *isai* head, and was installed in with this recognition unit, A production process to recognize lay of said destination by camera for said substrate recognition, A production process to demand a location of an above discharge jet as opposed to camera for said substrate recognition based on two said recognition result, *o* is included.

## [DETAILED DESCRIPTION OF THE INVENTION]

[0001]

## [TECHNICAL FIELD OF THE INVENTION]

The present invention relates to location detection method of a discharge jet of the electronic packaging equipment which vacuum adsorbs an electronic component to a discharge jet of *isai* head, and it is transferred to substrate, and is equipped and electronic packaging equipment.

[0002]

## [PRIOR ART]

As for the electronic packaging equipment, vacuum adsorbs an electronic component comprised by a

parts feeder to a discharge jet of *isai* head, and it is picked up, transfer is equipped with in appointed coordinate position of substrate. For this case, It is necessary lay of substrate is recognized before putting an electronic component on substrate, and to grasp a location of substrate in precision, because of this camera for substrate recognition is established in *isai* head unitedly. In addition, It is necessary to grasp the location that is precision of a discharge jet as opposed to camera for substrate recognition to put an electronic component on substrate in high location accuracy in this kind of electronic packaging equipment, because of this location detection of a discharge jet is done.

[0003]

Location detection of a discharge jet was done as follows conventionally, and it was done. In other words, It makes *isai* head hold cone replacing with a discharge jet, it is used with a *da* trace in substrate in this cone, it was with this *da* trace as a location of a discharge jet by detecting a location of this *da* trace in camera for substrate recognition.

[0004]

#### [PROBLEM TO BE SOLVED BY THE INVENTION]

However, It is troublesome and automation is difficulty, and detection accuracy, besides, to be high is hard to be got in the before method must attach and detach cone to and from *isai* head, there were problems of most that repeatability was hard to get.

[0005]

Therefore, The object of the present invention is to provide location detection method of a discharge jet in the electronic packaging equipment which, besides, repeatability can well demand a location of a discharge jet of *isai* head as opposed to camera for substrate recognition from with high accuracy for an auto and electronic packaging equipment.

[0006]

#### [MEANS TO SOLVE THE PROBLEM]

With this purpose, Electronic packaging equipment of the present invention establishes *isai* head and camera for substrate recognition unitedly and a location establishes a jig having a recognized destination with this camera and the recognition unit in visual field of this camera.

[0007]

In addition, Top of the unit which recognized *isai* head was moved, and a discharge jet of *isai* head and a production process it was at one with this *isai* head, and a production process to recognize a location of the destination by camera for a production process to recognize a location of a destination installed in visual field of camera for substrate recognition installed in and the substrate recognition and two recognition result were based on, and to demand a location of the discharge jet as opposed to camera for the substrate recognition were composed with this recognition unit.

[0008]

#### [MODE FOR CARRYING OUT THE INVENTION]

According to the present invention, A location of a destination is recognized in camera lay of a destination and a discharge jet is recognized with a recognition unit and is for substrate recognition, a location of a discharge jet can be demanded with of an auto and high accuracy by synthesizing these recognition result.

[0009]

Next, One detailed description of the preferred embodiment of the present invention is explained when taken with the drawing. Pictorial image figure, FIG. 8 of the use camera that reverse image figure of a recognition unit, FIG. 7 recognize the substrate as for pictorial image figure of a recognition unit, FIG. 6 as for block diagram of a control system of electronic packaging equipment, FIG. 5 as for *isai* head and perspective diagram of a recognition unit, FIG. 4 comprised by electronic packaging equipment as for plan of electronic packaging equipment, FIG. 3 as for perspective diagram of electronic packaging equipment in's best detailed description of the preferred embodiment of the present invention, FIG. 2 as

for FIG. 1 are compound figure of pictorial image of the reverse image and camera.

[0010]

In figure 1 and figure 2, guide rail 3 as positioning department of substrate 2 is installed in a top face of base 1. It is positioned substrate 2 is transported in consonance with guide rail 3 and and it is clamped in an appointed location. It is adjacently provided many several parts feeder 4 in both sides of guide rail 3. Each parts feeder 4 comprises an electronic component of various kinds. Recognition unit 5 is installed in guide rail 3 and parts feeder 4. In FIG. 3, Recognition unit 5 puts away line sensor 52 in the inside of retaining shield 51, and it is configured, slit 53 is formed in a top face of retaining shield 51.

[0011]

In figure 1 and figure 2, Y table 11 is installed in an each side part of base 1. Feed screw 12 of a Y-direction and rail 13 is installed in the inside of Y table 11. 14 is a Y-axis motor turning feed screw 12. In addition, X table 15 is built on Y table 11. Feed screw 16 of a X-direction and rail 17 is installed in the inside of X table 15. 18 is an X-axis motor turning feed screw 16.

[0012]

*isai* head 20 is held to X table 15. When Y-axis motor 14 drives, X table 15 moves to a Y-direction in consonance with feed screw 12. In addition, When X-axis motor 18 drives, *isai* head 20 moves to a X-direction in consonance with feed screw 16. By this, *isai* head 20 does horizontal displacement to a X-direction and a Y-direction.

[0013]

In FIG. 3, *isai* head 20 comprises three discharge jets 211,212,213. As for each discharge jet 211,212,213, backplate 22 is loaded. As for backplate 22, it is in visible radiation scattering board when vacuum adsorbed electronic component 9 is observed with recognition unit 5 to the lower end of discharge jet 211,212,213. 23 is bracket of a type face of *ko*, and, besides, Z shaft motor 24 is mounted face with. 25 is a perpendicular feed screw driven to Z shaft motor 24, and nut 26 is put on. Discharge jet shaft 27 of discharge jet 211,212,213 and 1 is coupled with nut 26. Therefore, As for nut 26, vertical motion assumes that Z shaft motor 24 drives, and feed screw 25 rotates in consonance with feed screw 25, discharge jet 211,212,213 do vertical motion, too.

[0014]

28 is a theta motor, and band 30 can leave belt to pulley 29 mounted the output shaft and discharge jet shaft 27 with. Therefore, When theta motor 28 drives, discharge jet 211,212,213 rotate mainly on the central axis, angle of direction of rotation of vacuum adsorbed electronic component 9 is compensated to the lower end of discharge jet 211,212,213 by this.

[0015]

In FIG. 3, camera 32 for substrate recognition is installed in *isai* head 20 unitedly. Footing of camera 32 comprises ha lens-barrel 33, 34. Jig 35 is held to lens-barrel 34 releasably. Jig 35 is the thing which inflection made a board body in box type, and small light guide hole-shaped destination 36 can leave an aperture in the underside center. In FIG. 3, three discharge jets 211,212,213 and destination 36 is located on the same line of a X-direction, if, therefore, *isai* head 20 is moved for line to a X-direction (the orientation that is perpendicular to the Y-direction which is stretcher orientation of line sensor 52), destination 36, discharge jet 211,212,213 can be recognized in high speed by means of line sensor 52 collectively.

[0016]

Line sensor 52 and camera 32 go through recognition department 41,42 respectively, and, in FIG. 4, it is connected to control part (CPU) 43. In addition, X-axis motor 18, Y-axis motor 14, Z shaft motor 24, theta motor 28 go through *isai* head drive 44, and it is connected to control part 43. 45 is a memory, and various data such as image data or routine data taken in in control part 43 is memorized. In addition, Control part 43 controls each factor in spite of being reading in data of memory 45.

[0017]

This electronic packaging equipment describes actuating accomplishment, electronic component 9 comprised to parts feeder 4 next are transferred to substrate 2 than framing such as for example the above, and to be equipped with. At first, Substrate 2 is transported in consonance with guide rail 3, and

it is clamped in an appointed location. Next, While moving *isai* head 20 in a horizontal direction, the thing which can specify a location of substrate 2 of recognition marking (not shown) formed to substrate 2 with camera 32 for substrate recognition got to this *isai* head 20 is image-pickuped. And lay of recognition marking is detected with recognition department 42, a location of substrate 2 (on-board lay of an electronic component) is recognized in control part 43. Data about lay of substrate 2 is stored to memory 45 temporarily. Next, Because X-axis motor 18 and Y-axis motor 14 drives in FIG. 2, *isai* head 20 moves to top of parts feeder 4. In there, Because Z shaft motor 24 drives, discharge jet 211,212,213 drop, and it rises, and it works, and vacuum adsorbs electronic component 9 comprised to parts feeder 4, and it is picked up. For this case, *isai* head 20 moves to a X-direction in three discharge jets 211,212,213 being provided on a pick up location of parts feeder 4, sequential fall / lifting makes work to discharge jet 211,212,213 of each, and vacuum adsorbs electronic component 9 to the lower end of each, and it is picked up.

[0018]

Next, *isai* head 20 moves to top of recognition unit 5, vacuum does location recognition of adsorbed electronic component 9 for consecutive to each discharge jet 211,212,213 by moving to a X-direction as shown in FIG. 3 linearly. Next, *isai* head 20 moves to top of substrate 2, thus fall / lifting makes work in a sequence to discharge jet 211,212,213, and electronic component 9 of each is equipped with in appointed coordinate position of substrate 2. In addition, Before this deployment, location drift of electronic component 9 is compensated. This correction follows recognition result of recognition unit 5, and it is done. In other words, With recognition unit 5, image data of each electronic component 9 is obtained to recognition department 41, but, recognition department 42 analyzes this image data, and a X-direction of electronic component 9 as opposed to discharge jet 211,212,213, a Y-direction, location drift of theta orientation are calculated. Control part 43 is based on a location of this X-direction, a Y-direction, location drift of theta orientation and substrate demanded by substrate recognition beforehand and positional relationship of a relative of discharge jet 211,212,213 as opposed to a reference point of camera 32, and complemented value of distance of *isai* head 20 is demanded. And it compensates by turning discharge jet 211,212,213 a X-direction and location drift of a Y-direction compensate by previously described complemented value is based on, and modifying revolution dosage of X-axis motor 18 and Y-axis motor 14 and and location drift of theta orientation drives theta motor 28.

[0019]

This electronic packaging equipment does as discussed above, and electronic component 9 is put on substrate 2, but , for this case, the location that at first is precision of discharge jet 211,212,213 as opposed to a reference point of camera 32 to be equipped with electronic component 9 in high location accuracy to substrate 2 must be grasped beforehand. In there, Referring to FIG. 5 ... FIG. 8, method detecting the location that is precision of discharge jet 211,212,213 as opposed to a reference point of camera 32 is explained next. In addition, When substrate 2 is recognized with camera 32, it is taken from camera 32, and jig 35 is taken off.

[0020]

At first, As shown in FIG. 3, top of unit 5 recognizing *isai* head 20 is moved to a X-direction linearly, destination 36, pictorial image of discharge jet 211,212,213 are obtained. FIG. 5 shows pictorial image obtained in this way. In addition, FIG. 6 that right and left reversed FIG. 5 is used, and it is described to do description intelligibly. Destination 36 and lay of discharge jet 211,212,213 are recognized with recognition department 41, is output to control part 43. A which is a reference point of the pictorial image which zero is line sensor 52, and is obtained out of FIG. 6 (a reference point of line sensor 52), B, C, J are vectoring to show a location of pictorial image of each discharge jet in from reference point zero.

[0021]

Next, Pictorial image of destination 36 is obtained with camera 32. Lay of destination 36 is recognized with recognition department 42, is output to control part 43. FIG. 7 is the vectoring that pictorial image of destination 36, a k show a location of destination 36 from reference point zero '. In addition, Zero 'is datum point of pictorial image obtained with camera 32, and this reference point zero' is a reference

point of camera 32. Next, Control part 43 is based on vectoring A, B, C, J and a vectoring k, and a location of discharge jet 211,212,213 as opposed to reference point zero 'is calculated, and it is demanded. It is the figure which synthesized FIG. 6 and FIG. 7 FIG. 8 is easy to understand description, and to do. M is vectoring from reference point zero 'to reference point zero namely vectoring to show positional relationship of reference point zero of line sensor 52 and a relative of reference point zero' of camera 32 in. In addition, Vectoring from reference point zero 'to each discharge jet (in other words, coordinate position of each discharge jet as opposed to reference point zero' of camera 32) seems to illustrate, and it is in A+M, B+M, C+M, J+M. In addition, After having unified the orientation that recognized pictorial image of FIG. 5 in line sensor 52 recognizing discharge jet 211,212,213 and destination 36 for camera 32 recognizing destination 36 from top from the lower part opposite to this by turning over in right and left as shown in FIG. 6, two pictorial image was synthesized as shown in FIG. 8.

[0022]

At first control part 43 demands vectoring M than  $M = K - J$ . Next, A+M, B+M, C+M are calculated, and control part 43 stores lay of each discharge jet as opposed to a reference point of camera 32 to request, memory 45.

[0023]

Besides, according to process, precision can easily detect a location of each discharge jet 211,212,213 as opposed to a reference point of camera 32 as above. In addition, Location detection of the discharge jet is done for replacements of a discharge jet frequently, but, it is easy any time and, according to process, repeatability can well detect a location of a discharge jet. In addition, *isai* head 20 of this detailed description of the preferred embodiment is the thing which it is, but is preferable with several number of the discharge jet which *isai* head 20 comprises with three discharge jets 211,212,213. If installation lay of jig 35 more is the locality that destination 36 is located in visual field of camera 32, even which location of *isai* head 20 is preferable. In addition, Jig 35 does not need to be always removable, and it is had always ready to *isai* head 20, it makes, in a typical example, evacuate outside visual field of camera 32, when a location of a discharge jet is detected, visual field of camera 32 seems to be moved to, and it may be composed. If configuration and configuration of destination 36 more are the things which can be observed from camera 32 and both line sensor 52, it is not well a thing limited to this detailed description of the preferred embodiment.

[0024]

#### [EFFECT OF THE INVENTION]

According to the present invention, Because, besides, accuracy easily can well demand a location of a discharge jet as opposed to camera for substrate recognition any time, a location of a discharge jet is always grasped in precision, location accuracy can be well equipped with an electronic component in substrate.

#### [BRIEF DESCRIPTION OF DRAWINGS]

[FIG. 1]

A perspective diagram of electronic packaging equipment in one detailed description of the preferred embodiment of the present invention

[FIG. 2]

A plan of electronic packaging equipment in one detailed description of the preferred embodiment of the present invention

[FIG. 3]

*isai* head and a perspective diagram of a recognition unit which were comprised by electronic packaging equipment in one detailed description of the preferred embodiment of the present invention

[FIG. 4]



A block diagram of a control system of electronic packaging equipment in one detailed description of the preferred embodiment of the present invention

[FIG. 5]

A figure of pictorial image of a recognition unit in one detailed description of the preferred embodiment of the present invention

[FIG. 6]

A figure of reverse image of a recognition unit in one detailed description of the preferred embodiment of the present invention

[FIG. 7]

Pictorial image figure of camera for substrate recognition in one detailed description of the preferred embodiment of the present invention

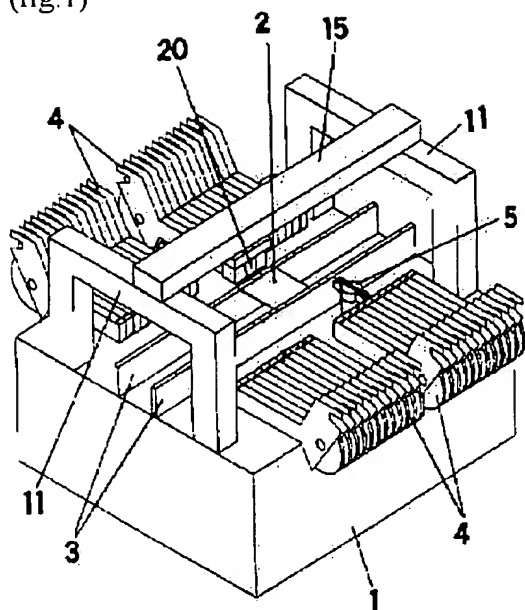
[FIG. 8]

Complex figure of pictorial image of reverse image in one detailed description of the preferred embodiment of the present invention and camera

[DENOTATION OF REFERENCE NUMERALS]

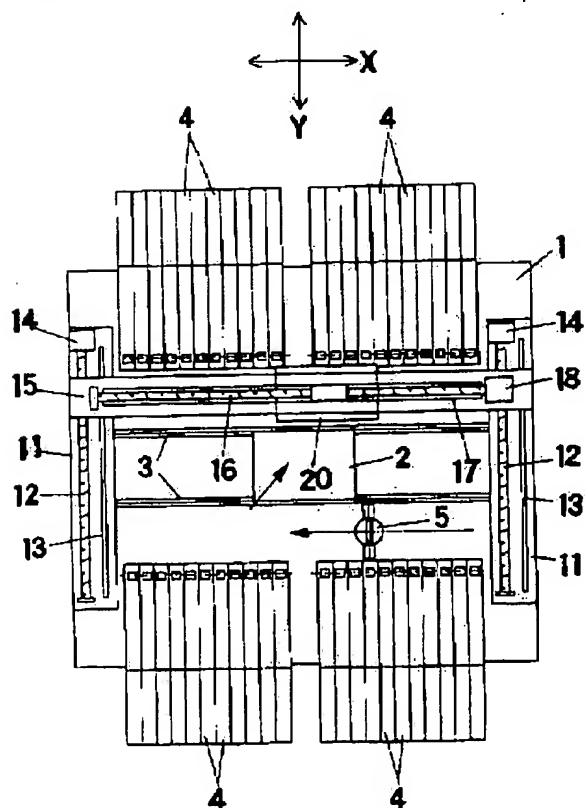
2 Substrate 3 A guide rail 4 A parts feeder 5 A recognition unit 9 An electronic component 20 *isai* head  
32 Camera 35 A jig 36 A destination 52 A line sensor 211,212,213 A discharge jet

(fig.1)

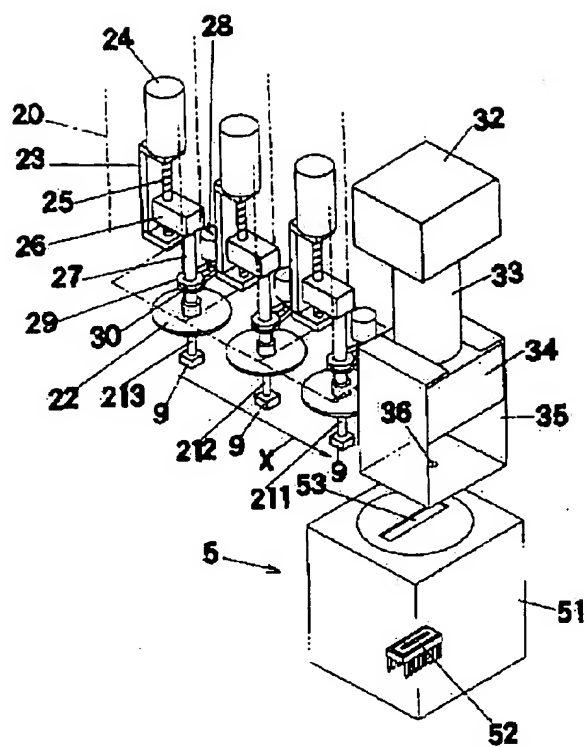


- |           |          |
|-----------|----------|
| 2 基板      | 5 印刷ユニット |
| 3 ガイドレール  | 20 移動ヘッド |
| 4 パーツフィーダ |          |

(fig.2)

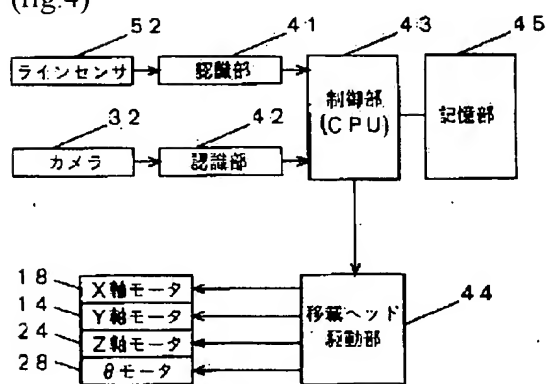


(fig.3)

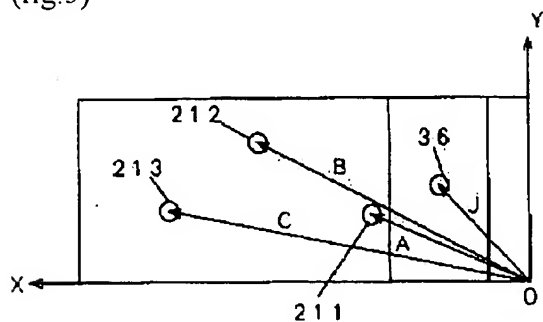


- |     |      |    |        |
|-----|------|----|--------|
| 9   | 電子部品 | 32 | カメラ    |
| 211 | ノズル  | 35 | 治具     |
| 212 | ノズル  | 38 | ターゲット  |
| 213 | ノズル  | 52 | ラインセンサ |

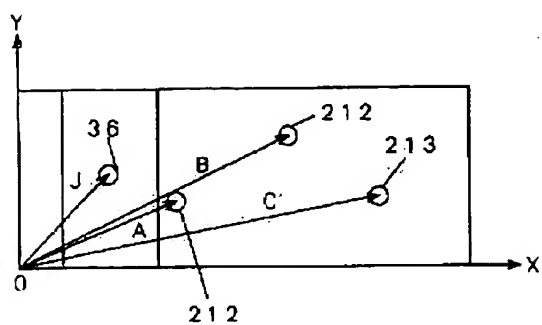
(fig.4)



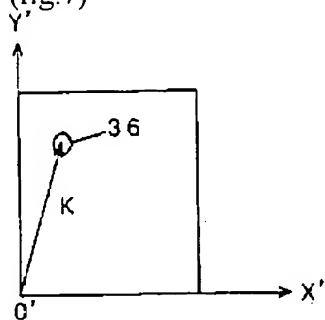
(fig.5)



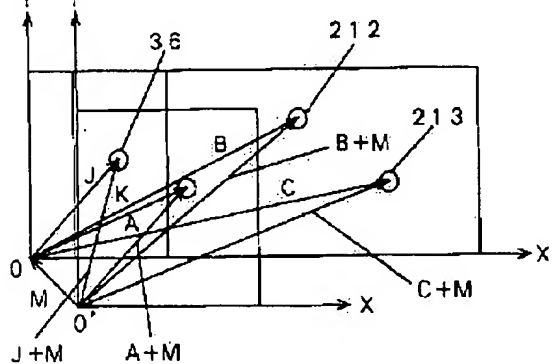
(fig.6)



(fig.7)



(fig.8)



**WEST**

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L1: Entry 3 of 3

File: DWPI

Jan 12, 1996

DERWENT-ACC-NO: 1996-102877

DERWENT-WEEK: 199611

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TITLE: Electronic component mounting device - has judgement unit which synthesises camera image and pitch of detected nozzle and judges kind of nozzle

PRIORITY-DATA: 1994JP-0135646 (June 17, 1994)

PATENT-FAMILY: (1 member)

PUB-NO	PUB-DATE	LANGUAGE	PAGES	MAIN-IPC
<u>JP 08008600 A</u>	January 12, 1996		005	H05K013/08

INT-CL (IPC): B23 P 19/00; B23 P 21/00; H05 K 13/04; H05 K 13/08

**Patent/ public disclosure document**

**1996008600**

[Abstract(made by the applicant)] [Claims] [Detail Description] [Drawing Description]

**PATOLIS will not assume the accuracy or the reliability of the translation provided automatically by computer and will not be responsible for any errors, omissions or ambiguities in the translations and any damages caused by the use of the translation.**

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(57)

[ABSTRACT]

[PURPOSE]

A kind check of a discharge jet is done ahead of component mounting.

[CONSTITUTION]

The estimate department which a center-to-face dimension detecting element to detect camera acquiring level projection pictorial image and bearing height of the lower end of a discharge jet of a discharge jet and pictorial image of camera and bearing height of a center-to-face dimension detecting element are totalled, and determine a kind of a discharge jet is comprised.

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[WHAT IS CLAIMED IS:]

[Claim 1]

Electronic packaging equipment; comprising: The component feed section which supplies a component, The table which positions substrate, *isai* head comprising plural discharge jets depending on a kind of a component is comprised, the camera which acquires level projection pictorial image of an above discharge jet, A center-to-face dimension detecting element to detect bearing height of the lower end of said discharge jet, The estimate department which pictorial image of said camera and bearing height of said center-to-face dimension detecting element are totalled, and determine a kind of a discharge jet.

---

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[INDUSTRIAL APPLICATION FIELD]

The present invention relates to the electronic packaging equipment which mounting of a component is preceded, and examine making a mistake arming of a discharge jet.

[0002]

[PRIOR ART]

To electronic packaging equipment, there is the thing which loaded a discharge jet of a different kind in *isai* head depending on a kind of a component.

[0003]

[PROBLEM TO BE SOLVED BY THE INVENTION]

However, there can be the thing that a discharge jet of a false *matta* kind is loaded by artificial mistakes of operating personnel. In such case, Even if, with conventional electronic packaging equipment, false *mari* matches a kind of a discharge jet, this false *mari* cannot be detected, a discharge jet waked up an adsorption mistake at the time of component mounting actuating, and there were problems that nonconformity of mounting actuating occurred.

[0004]

In there, The object of the present invention is to provide the electronic packaging equipment which working is preceded, and can ensure a kind of a discharge jet mounting of a component.

[0005]

[MEANS TO SOLVE THE PROBLEM]

The estimate department which electronic packaging equipment of the present invention totals a center-

to-face dimension detecting element to detect camera acquiring level projection pictorial image and bearing height of the lower end of a discharge jet of a discharge jet and pictorial image of camera and bearing height of a center-to-face dimension detecting element, and determine a kind of a discharge jet is comprised.

[0006]

#### [OPERATION]

In the framing, a component is adsorbed from component feed section with a discharge jet of *isai* head, if actuating to implement in substrate is done, from going ahead of, level projection pictorial image of a discharge jet by camera and lower end bearing height of a discharge jet by a center-to-face dimension detecting element, estimate department determines a kind of a discharge jet. If, as a result of this distinction, there is false *mari* in a kind of a discharge jet, it is changed, and a right discharge jet can evade nonconformity of mounting actuating before mounting actuating.

[0007]

#### [EXAMPLE]

Next, Embodiment of the present invention is explained when read in conjunction with the accompanying drawings. FIG. 1 is a plan view of electronic packaging equipment in one embodiment of the invention. Out of FIG. 1, 1 comprises base, 2 in central top of base 1, as for rotary head rotating index by the drive means that is not illustrated in arrow M orientation, 4, *isai* head which multiple pieces are installed in in circumference department of rotary head 2, 3 accept a kind of a component to adsorb in circumference department of *isai* head 4, and a plural number is this discharge jet it is worsening, and to be installed in. A is component feed section arranged to the rearward of base 1, and parts feeder supplying component P 1 by *ke*, migration table that parts feeder 5 is adjacently provided as for 6 of the kind that, of these, 5 is different, 8 engage feed nut 7 installed in to the rearward of migration table 6 threadedly, it spreads to a X-direction, revolution feed screw jikushisa freely, 9 are drive motor turning feed screw 8 to base 1. When drive motor 9 is driven, it can make parts feeder 5 supplying component P of a kind to be necessary for component feeding station S1 of rotary head 2 be located.

[0008]

S2 is installed in the lower part of rotary head 2, after winning, by observation gateway B to explain in detail, level projection pictorial image of discharge jet 3 is acquired, and it is the first recognition station which it is out of a location of component P adsorbed to discharge jet 3, and measure  $f\phi$  X,  $f\phi$  Y. S3 is the second recognition station acquiring lower end bearing height information of discharge jet 3 by center-to-face dimension detecting element C to explain in detail later. In addition, 11, 12 are installed in a front part of base 1, substrate import conveyer which carries in substrate 20 to arrow N1 orientation, 13, 14 are substrate export conveyers carrying out substrate 20 that mounting of component P was finished in arrow N2 orientation. In addition, Substrate holder 19 holding substrate 20 is installed in and X table which 15 comprises on base 1, and is driven by X motor 16, 17 are Y table driven to Y motor 18 Y table 17. Component mounting station, S5 that discharge jet 3 implements component P to substrate 20 that S4 was positioned by X table 15, Y table 17 are the discharge jet select stations where discharge jet select department 21 choosing next time employing discharge jet 3 was installed in. And, as for *isai* head 4, a sequential circulates through component feeding station S1, recognition station S2, component mounting station S3, discharge jet select station S4 because rotary head 2 rotates index in arrow M orientation.

[0009]

FIG. 2 is profile of an observation gateway in one embodiment of the invention. Out of FIG. 2, *ru* box-shaped retaining shield, camera that optic axis is received in retaining shield 30 as for 31 by sideways-facing for the purpose of it being, 32 are the mirrors which turn optic axis of camera 31 to discharge jet 3 of *isai* head 4 through 90 degrees bending, opening 30a. FIG. 6 (a) ... (d) is an illustration to show pictorial example of camera in one embodiment of the invention, and, out of FIG. 6, V shows visual field of camera 31. In addition, It is image of *merufunozuru* 3D for image of large discharge jet 3A for



FIG. 6 (a) to adsorb a large-sized electronic component, image of 1005 discharge jet 3B for FIG. 6 (b) to adsorb 1005 chip which are small in emergency, image of 1608 discharge jet 3C for FIG. 6 (c) to adsorb 1608 chip of medium size, FIG. 6 (d) to adsorb *merufuchippu* of medium size. As is apparent from FIG. 6 (a) ... (d), image of camera 31 is based on, it is comparatively easy to identify large-scale large discharge jet 3A, 1005 small discharge jet 3B, 1608 discharge jet 3C of medium size or *merufunozuru* 3D. However, It is very difficult that 1608 discharge jet 3C is distinguished between and *merufunozuru* 3D only by image of camera 31.

[0010]

FIG. 3 is profile of a center-to-face dimension detecting element in one embodiment of the invention. It is a box having concavity 40a, and, among center-to-face dimension detecting element C, 40 gets possible to pass discharge jet 3 which made concavity 40a protrude from *isai* head 4 to the lower part in the vicinity of a raceway track of *isai* head 4. In addition, 41 is installed in one wall surface of concavity 40a, laser irradiation device irradiating lengthwise slit glow, 42 are light amplification by stimulated emission of radiation optical receiver installed in the other wall surface opposed to laser irradiation device 41. Slit glow is that is to say irradiated from laser irradiation device 41, bearing height H of the lower end of discharge jet 3 can be measured by passing discharge jet 3 between laser irradiation device 41 and light amplification by stimulated emission of radiation optical receiver 42. It is FIG. 7 (a) (b), profile of a discharge jet in one embodiment of the invention, and 1608 discharge jet 3C (FIG. 7 (a)) and *merufunozuru* 3D (FIG. 7 (b)) are shown. By way of example only, overall length of discharge jet itself is changed, and, with an expert skill stage, *i* occupies bearing height of the lower end of a discharge jet in 1608 discharge jet 3C and *merufunozuru* 3D at least here by moving an installation location of top and bottom orientation to *isai* head 4. Therefore, Center-to-face dimension detecting element C 1608 is to detect bearing height named difference (1608 discharge jet 3C, bearing height H 1, *merufunozuru* 3D, bearing height H 2) about discharge jet 3C and *merufunozuru* 3D, it is as it is identified by this, and *zu* identifying 1608 *i* discharge jet 3C and *merufunozuru* 3D.

[0011]

FIG. 4 is a block diagram of electronic packaging equipment in one embodiment of the invention, and recognition department that 51 recognizes the pictorial image which camera 31 got, temporary memory department that temporary memory does data of bearing height of the lower end of discharge jet 3 which pictorial image and center-to-face dimension detecting element C which camera 31 got measured as for 52, 53 are estimate department determining a kind of the discharge jet which, therefore, look at a flow chart of FIG. 5.

[0012]

FIG. 5 is a flow chart of discharge jet kind estimate of electronic packaging equipment in one embodiment of the invention. After discharge jet 3 was loaded to *isai* head 4 in start-up of electronic packaging equipment in one embodiment of the invention handling of FIG. 5 here, is done before mounting actuating of an electronic component. And, By this attention, an arming error of discharge jet 3 is checked, if there is an arming error, operating personnel corrects a discharge jet.

[0013]

By the way, In step 1, judgment department 53 determines image data of temporary memory department 52 with 1005 discharge jets (step 3) about image of a narrow path like discharge jet (step 2), FIG. 6 (b) about image of a large diameter like investigation, FIG. 6 (a) very much. However, 1608 discharge jets or either of *merufunozuru* reserve about image of a middle diameter (step 4), and bearing height data of the lower end of the discharge jet which a roller looks at when center-to-face dimension detecting element C detected is examined (step 5). And, If bearing height H 1 of 1608 discharge jets shown in FIG. 7 (a) is almost accorded with, it is determined with 1608 discharge jets (step 6), if bearing height H 2 of *merufunozuru* is agreed with, it is determined with *merufunozuru* (step 7).

[0014]

#### [EFFECT OF THE INVENTION]

Because the estimate department which electronic packaging equipment of the present invention totals a

center-to-face dimension detecting element to detect camera acquiring level projection pictorial image and bearing height of the lower end of a discharge jet of a discharge jet and pictorial image of camera and bearing height of a center-to-face dimension detecting element, and determine a kind of a discharge jet is comprised, mounting actuating is preceded, and an arming mistake of a discharge jet can be known, nonconformity of mounting actuating can be controlled.

---

#### [BRIEF DESCRIPTION OF DRAWINGS]

##### [FIG. 1]

A plan of electronic packaging equipment in one embodiment of the invention

##### [FIG. 2]

Profile of an observation gateway in one embodiment of the invention

##### [FIG. 3]

Profile of a center-to-face dimension detecting element in one embodiment of the invention

##### [FIG. 4]

A block diagram of electronic packaging equipment in one embodiment of the invention

##### [FIG. 5]

A flow chart of discharge jet kind estimate of electronic packaging equipment in one embodiment of the invention

##### [FIG. 6]

(a) An illustration to show pictorial example of camera in illustration (d) one embodiment of the invention to show pictorial example of camera in illustration (c) one embodiment of the invention to show pictorial example of camera in illustration (b) one embodiment of the invention to show pictorial example of camera in one embodiment of the invention in in in

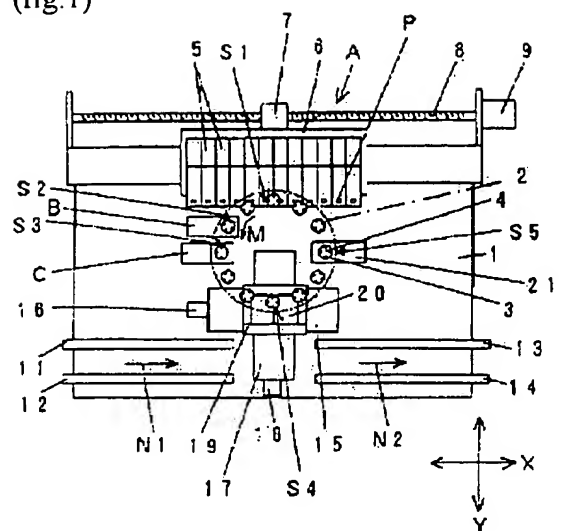
##### [FIG. 7]

(a) Profile of a discharge jet in profile (b) one embodiment of the invention of a discharge jet in one embodiment of the invention

#### [DENOTATION OF REFERENCE NUMERALS]

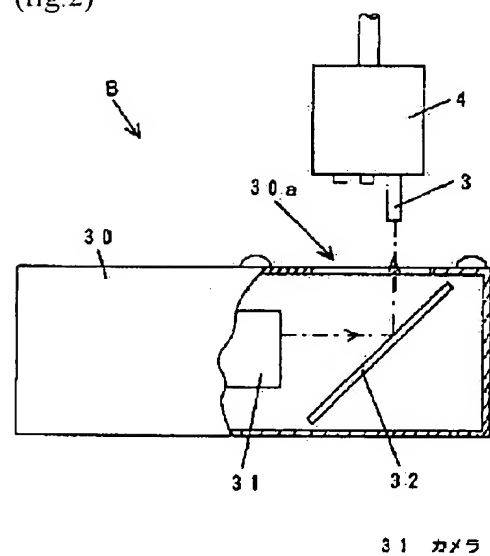
3 A discharge jet 4 *isai* head 15 X table 17 Y table 20 Substrate 31 Camera 53 A judgment department  
A Component feed section C A center-to-face dimension detecting element

(fig.1)



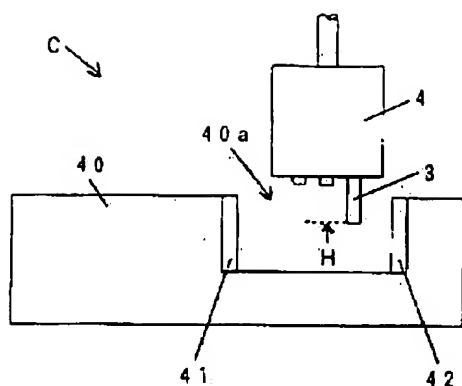
- 3 ノズル
- 4 移動ヘッド
- 15 Xテーブル
- 17 Yテーブル
- 20 基板
- A 部品供給部
- C ノズル高さ検出部

(fig.2)

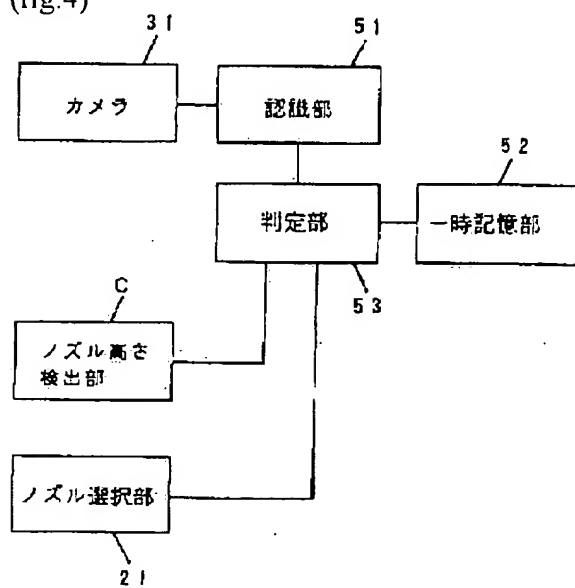


31 カメラ

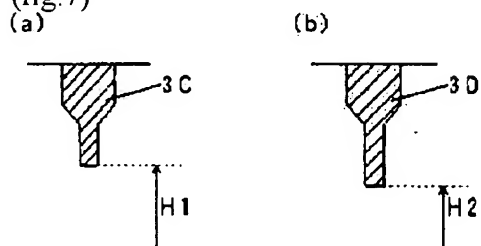
(fig.3)



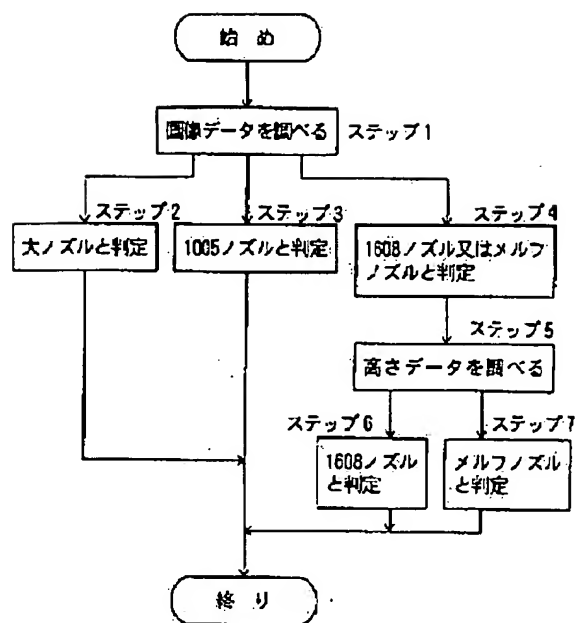
(fig.4)



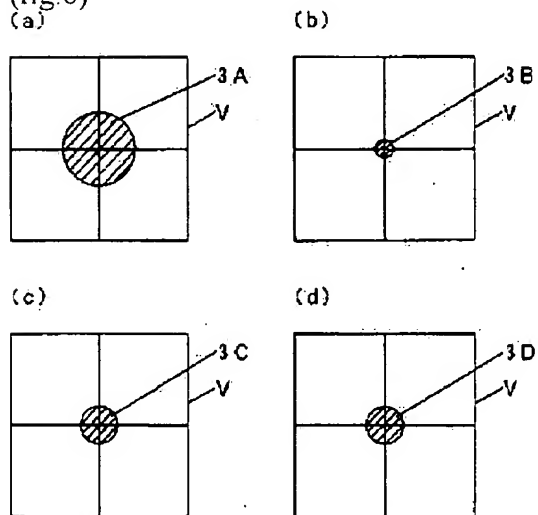
(fig.7)



(fig.5)



(fig 6)



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TITLE: Component recognition appts. for circuit board mounting machine - has light emitting part for irradiating electronic component held by suction nozzle, with line sensor arranged to received light after path switching NoAbstract

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**Patent/ public disclosure document**

**1996032299**

[Abstract(made by the applicant)] [Claims] [Detail Description] [Drawing Description]

**PATOLIS will not assume the accuracy or the reliability of the translation provided automatically by computer and will not be responsible for any errors, omissions or ambiguities in the translations and any damages caused by the use of the translation.**

(57)

**[ABSTRACT]****[PURPOSE]**

A component detecting unit is composed to a compact more.

**[CONSTITUTION]**

It is displaceable, and adsorption head 6 having nozzle member 8 is established over component feed section 5 and component threaded mounting 4, the first luminescence department 18 which irradiated visible radiation to a component adsorbed to nozzle member 8 was established to adsorption head 6. In addition, Displaceable component detecting unit 20 is established to head body 21 of adsorption head 6 as against this head body 21, optical prism 23 to lead line sensor 23 and component image receiving the second luminescence department 22 and component image irradiating visible radiation to line sensor 24 and optical lens 25 is established to a component adsorbed to nozzle member 8 to this component detecting unit 20, component image after the first optical path length alteration department 23a which made the orientation that was migration orientation and parallel of component detecting unit 20 in component image with optical prism 23 do inflection and inflection by this was composed from the second optical path length alteration department 23b which made a horizontal direction, even more particularly, to be perpendicular to migration orientation of component detecting unit 20 do inflection.

**[WHAT IS CLAIMED IS:]****[Claim 1]**

In the mounting airplane that component feed section and a component threaded mounting were lasted for, and it was displaceable, and established adsorption head having nozzle member for component arming; Component recognition device of mounting machine; comprising: Luminescence region to irradiate glow at an electronic component adsorbed by said nozzle member, Is equipped by a head body of head for said adsorption, and a displaceable component detecting unit is established in uniformity orientation as against this head body, optical path length changing means having division making the orientation that is migration orientation and parallel of an above component detecting unit in visible radiation after was irradiated to this component detecting unit by an above electronic component do inflection, A light-receiving section comprising of the line sensors which are disposed by a said component detecting unit to receive visible radiation after optical path length alteration by this optical path length changing means.

**[Claim 2]**

Component recognition device of mounting machine; according to claim 1 wherein; Said luminescence department is loaded in upward department of said nozzle member by said head body, the first luminescence department which irradiates visible radiation from foraminous backing layer of an electronic component adsorbed by said nozzle member, Is equipped by a said component detecting unit, ahead of the first above luminescence department, the visible radiation is scattered at the time of luminescence of the first luminescence department, and detection auxiliary member of framework forming background of an above electronic component at the time of luminescence of the second above luminescence department is arranged on by the second luminescence department irradiating visible radiation from front side of an electronic component adsorbed by said nozzle member.

**[Claim 3]**

In; Said optical path length changing means is a thing comprising of optical prisms; Said claim 1 or a component recognizer of mounting machine as claimed in 2; wherein; The second said luminescence department is arranged by downward lay of optical path length changing means.



## [DETAILED DESCRIPTION OF THE INVENTION]

[0001]

## [INDUSTRIAL APPLICATION FIELD]

The present invention relates to the equipment which recognizes this component to examine a location and gradient of a component adsorbed in mounting machine by nozzle member of adsorption head, and particularly to component recognition device with the use of a line sensor.

[0002]

## [PRIOR ART]

Mounting airplane to load an electronic component on a circuit board by means of adsorption head comprising nozzle member is known to general conventionally. After head this mounting machine mentioned above, and to adsorb adsorbed a component from component feed section, an arming location is moved to, and a component is loaded, but, a component examining condition of a component adsorbed by nozzle member is recognized so that dispersion produces in a location and gradient of a component at the time of adsorption, it is based on, and estimate of the good or bad of adsorption condition and correction of an arming location are done.

[0003]

There is the thing which installed a unit for recognition such as a line sensor or CCD camera in an appointed location on a base of mounting airplane, for example, for settlement as technique of this component recognition, but, after as thus described then adsorption head moves after component adsorption to an establishment point of a unit for recognition, and recognition attention was done here, time suffers by arming from adsorption to move to an arming location.

[0004]

Therefore, By way of example only, the component detecting unit which established an optical system to lead electronic component image adsorbed by a line sensor and nozzle member to a line sensor can be moved along with adsorption head, and a relative is displaceable, and adsorption head moves a component detecting unit for an electronic component adsorbed by nozzle member in the condition which raised nozzle member in the course which moves from an adsorption location to an arming location to a component recognition location, and reading of pictorial image can be done, and the equipment which planned contraction of mounting time is proposed as against an adsorption head body in uniformity orientation by establishing (Japanese Patent Laid-Open No. 5-335793 bulletin).

[0005]

## [PROBLEM TO BE SOLVED BY THE INVENTION]

As thus described it is possible, and it is compact, and, with the equipment which recognized a component in course moving adsorption head from an adsorption location to an arming location, a component detecting unit is composed, and jumboization of adsorption head is prevented, and it is desirable in contraction of a mounting disposition time or face of department spacing it is possible, and it is small, and to do extension stroke from a component adsorption location of the nozzle member to a recognition location.

[0006]

In a place, After making the orientation that is perpendicular to migration orientation of a component detecting unit with the first mirror installed electronic component image adsorbed according to the configuration of a component detecting unit shown as embodiment in the bulletin by nozzle member at an angle of 45 degrees in a location going along the lower part of nozzle member (a widthwise direction) do inflection, because it is a thing the second mirror is gone through, and to lead to a line sensor, when the problem was taken warning by, there is yet room of betterment. In other words, In this device, because total image of a widthwise direction of an electronic component adsorbed by nozzle member is projected in lengthwise of the first mirror (top and bottom orientation), and it is led to a line sensor,

dimension of top and bottom orientation of a mirror is called for so that dimension of a widthwise direction enables recognition of a big electronic component, top and bottom orientation occupancy ship's space of a mirror is magnified. With this, extension stroke from an adsorption location of nozzle member to a recognition location becomes big.

[0007]

The present invention is achieved to solve the problem, it is for the purpose of providing component recognition device of the mounting airplane that a compact can compose a component detecting unit more.

[0008]

#### [MEANS TO SOLVE THE PROBLEM]

Component feed section and a component threaded mounting are lasted for, and it is displaceable, and, as for the invention concerning claim 1, is equipped adsorption head having nozzle member of component *sochakuyo* by a head body of luminescence department irradiating *te* visible radiation toward an electronic component adsorbed in established mounting airplane by the nozzle member and head for adsorption, and a displaceable component detecting unit is established in uniformity orientation as against this head body, a light-receiving section comprising of the line sensors which visible radiation after optical path length alteration by optical path length changing means having division making the orientation that is migration orientation and parallel of a component detecting unit mentioning visible radiation after was irradiated by the electronic component above do inflection and this optical path length changing means seems to be received, and is disposed by a component detecting unit is established to this component detecting unit.

[0009]

As for the invention concerning claim 2, the luminescence department is loaded in upward department of the nozzle member in invention of claim 1 by the head body, is equipped by the first luminescence department irradiating visible radiation from foraminous backing layer of an electronic component adsorbed by the nozzle member and a component detecting unit, ahead of the first luminescence department, the visible radiation is scattered at the time of luminescence of the first luminescence department, and detection auxiliary member of framework forming background of the electronic component at the time of luminescence of the second luminescence department is arranged on by the second luminescence department irradiating visible radiation from front side of an electronic component adsorbed by the nozzle member.

[0010]

The optical path length changing means is a thing comprising of optical prisms, and, as for the invention concerning claim 3, the second luminescence department is arranged on lower part location of optical path length changing means in claim 1 or two invention.

[0011]

#### [OPERATION]

According to the invention of claim 1, a component detecting unit is moved as against a head body of adsorption head within the course that adsorption head is made to move to a component threaded mounting by component feed section, image of an electronic component adsorbed in nozzle member by this is taken in by a light-receiving section comprising of the line sensors. In doing so, While total image of an electronic component is made to do inflection by the optical path length changing means in the orientation that is migration orientation and parallel of a component detecting unit, is taken in for consecutive by a light-receiving section.

[0012]

Irradiated glow is scattered by detection auxiliary member of framework when emitted light according to invention of claim 2 the first luminescence department. By this, Glow is irradiated by foraminous backing layer of an electronic component adsorbed by nozzle member, and projection image of the electronic component is taken in by a light-receiving section. On the other hand, When is emitted light

the second light emitting means, irradiation visible radiation reflects back in front side of an electronic component, front image of an electronic component is taken in to a light-receiving section by this. Then, Background of the electronic component that the detection auxiliary member of framework is adsorbed by nozzle member is formed.

[0013]

According to invention of claim 3, as for the glow irradiated by the second luminescence department, it is irradiated prism in front side of the electronic component which it transmits, and is adsorbed by nozzle member. And, Glow reflected back with an electronic component is irradiated in an optical prism again, is done flexure by prism, and this visible radiation is led to a light-receiving section.

[0014]

#### [EXAMPLE]

Embodiment of the present invention is explained based on drawing.

[0015]

FIG. 1 shows an example of configuration of the whole mounting machine. In this figure, transportation line 2 comprising of conveyor is comprised on base 1 of mounting machine, circuit board 3 becomes transport to appointed component threaded mounting 4 by this transportation line 2. Component feed section 5 is arranged in an each side of this transportation line 2, this component feed section 5 supplies an electronic component by means of tape feeder 5a.

[0016]

In addition, Adsorption head 6 is installed in top of base 1 of mounting machine, this adsorption head 6 lasts for component feed section 5 and component threaded mounting 4 and becomes displaceable. By way of example only, Head support member 12 is disposed on rail 11 of Y-axis direction installed in on base 1, and ball thread 14 is gone through with servo motor 13, and migration of Y-axis orientation of head support member 12 is done, and adsorption head 6 is supported to rail 15 of X-axis orientation installed to head support member 12, and ball thread 17 is gone through with servo motor 16, and migration of X-axis orientation of adsorption head 6 becomes do.

[0017]

Adsorption head 6 comprises nozzle member 8 for head body 7 and component adsorption to show in FIG. 2 and FIG. 3, and component detecting unit 20 is equipped. In addition, The first luminescence department 18 which it is turned to an electronic component adsorbed to nozzle member 8 at the time of later component recognition, and irradiate visible radiation and detection auxiliary member of framework 19 are loaded to head body 7.

[0018]

Nozzle member 8 comprises a plural number in embodiment of delineation, is stood in line these nozzle member 8 by a transverse direction, it goes up and down to discharge jet holder 9 installed in head body 7 and is installed pivotally. And, The going up and down of nozzle member 8 and a turn are done by a drive means of servo motors out of figure, and negative pressure for component feeding becomes supply to nozzle member 8 by a figure outside negative pressure feed means.

[0019]

The first luminescence department 18 lasts for division to arrange of nozzle member 8 as shown in figure 2 and figure 4 (a), and it is arranged on side of the each side department (one part left-and right-side in FIG. 4 (a)). For example, this the first luminescence department 18 is the thing which a lot of LED is arranged on in the shape of a color coder, and bracket is gone through, and it is loaded to head body 7. And, When the division which nozzle member 8 adsorbs an electronic component, and later component detecting unit 20 arranges nozzle member on in condition in an appointed lifting location (a recognition location) is passed, it is turned to an electronic component, and visible radiation is irradiated.

[0020]

It is at one, and detection auxiliary member of framework 19 is installed to the first luminescence department 18 in front of the first luminescence department 18 (downward in FIG. 2). For example, as

for this detection auxiliary member of framework 19, sheet metal and ceramic made by milk-white acryl are configured from sheet metal made. And, Background of an electronic component adsorbed to nozzle member 8 at the time of luminescence of the second luminescence department 22 equipped with to later component detecting unit 20 is formed while the irradiation visible radiation is scattered at the time of luminescence of the first luminescence department 18.

[0021]

Component detecting unit 20 goes through band 27 by motor 26, and it becomes operate.

[0022]

As for the mechanism to operate this component detecting unit 20, it is as shown in FIG. 2 and FIG. 3 concretely. In other words, Motor 26 is installed in top of head body 7, and guide rods 28 and ball thread 29 are arranged on a widthwise direction each side of footing of head body 7 respectively, unit main frame 21 of component detecting unit 20 is supported to guide rods 28 slidably, and it is engaged threadedly to ball thread 29. Track bolt screw 29 is coupled with motor 26 with band 27 in a one end, ball thread 29 rotates by a drive of motor 26, component detecting unit 20 moves with it. And, Division to arrange nozzle member on from a full-fledged side appearance of division to arrange of nozzle member 8 is gone along, and another end side appearance is lasted for, and component detecting unit 20 gets possible to move.

[0023]

FIG. 4 (a) (b), a structure of component detecting unit 20 are shown. As shown in these figure, unit main frame 21 has a configuration of cross section generally U-shaped which it is at one, and comprised each side department and a bottom, it is comprised, when component detecting unit 20 moves in condition in lifting end nozzle member 8, the lower part of nozzle member 8 is passed.

[0024]

To component detecting unit 20, the second luminescence department 22 and optical prism (optical path length changing means) 23 to lead image of electronic component P to line sensor 24 in the case of line sensor 24 as a light-receiving section and component recognition and optical lens 25 are comprised.

[0025]

It is configured, and the second luminescence department 22 is loaded same as the first luminescence department 18 in a bottom of unit main frame 21 by LED of mass, when the division which nozzle member 8 adsorbs electronic component P, and component detecting unit 20 arranges nozzle member on in condition in an appointed lifting location is passed, visible radiation is irradiated as against electronic component P.

[0026]

It is configured from the second optical path length alteration department 23b making optical prism 23 turns inflection done visible radiation to a widthwise direction by the first optical path length alteration department 23a and this which make the orientation that is migration orientation and parallel of component detecting unit 20 mentioning the visible radiation that it is incident on above from top (as shown in FIG. 2, alternate long and short dash line arrow) do inflection more, and level (as shown in FIG. 4 (b), solid line arrow) do inflection.

[0027]

Optical prism 23 is loaded by bottom portion of unit main frame 21, but, in example of delineation, the first optical path length alteration department 23a seems to be located in top of the second luminescence department 22, and optical prism 23 is loaded. In other words, In this configuration, it transmits, and the the first visible radiation turns optical path length modification department 23a to top, and, at the time of luminescence of the second luminescence department 22, is irradiated, but, inflection becomes make to do visible radiation irradiated in the first optical path length alteration department 23a like statement above by top in the orientation that is migration orientation and parallel of component detecting unit 20.

[0028]

Line sensor 24 is arranged by sides of main body of unit 21 (FIG. 4, light-hand side part), optical lens 25 for condensing is arranged on front of this line sensor 24 (FIG. 4, right side front). In other words, Irradiated glow or visible radiation reflected back in electronic component P which is irradiated from the

second luminescence department 22, and is adsorbed to nozzle member 8 goes through optical prism 23 from the first luminescence department 18, and is led to a side of unit main frame 21, after was done condensing with optical lens 25, become receive with line sensor 24.

[0029]

The image data which image processing department 30 is connected to component detecting unit 20, and was taken in with line sensor 24 is input into this image processing department 30. And, After predetermined image processing was given in image processing department 30, a location and gradient of electronic component P adsorbed to nozzle member 8 in computation unit out of figure are operated, this is based on, and a location at the time of component arming, correction of gradient become do.

[0030]

Next, A description is made of action of the component recognition device which there is with the configuration described above.

[0031]

After an electronic component was adsorbed from component feed section 5 by each nozzle member 8 of adsorption head 6 of mounting machine, head 6 which is risen to appointed bearing height, and each nozzle member 8 adsorbs moves to component threaded mounting 4, but, in transfer process of this adsorption head 6, component detecting unit 20 is driven by motor 26, uniformity orientation is moved to as against head body 7. And, While this component detecting unit 20 passes a point to arrange of nozzle member 8, while is emitted light the first luminescence region 18 or the second luminescence department 22, image of electronic component P adsorbed to nozzle member 8 with line sensor 24 is read.

[0032]

In the embodiment, configuration and dimension of electronic component P adsorbed to nozzle member 8 are accepted, and light source namely the first luminescence department 18 and the second luminescence department 22 are changed, and, in reading of image of such electronic component P, reading of image becomes do.

[0033]

The first luminescence department 18 is made to emit light in the event of an electronic component of large-scale, by way of example only, IC of comparing belonging to lead of helix as against nozzle member 8 electronic component P adsorbed to nozzle member 8 to be concrete when it is explained.

[0034]

When the first luminescence department 18 emits light, the visible radiation is scattered with detection auxiliary member of framework 19, is irradiated by this electronic component, and the transmitted light goes through optical prism 23 and optical lens 24, and is received to line sensor 22 by foraminous backing layer of an electronic component adsorbed to the first luminescence department 18 (side upward in FIG. 4 (a)). In other words, Projection image of an electronic component adsorbed to nozzle member 8 is taken in to line sensor 24. And, Recognition of the electronic component which image data to show projection image of the electronic component which it does it this way with image processing department 30, and was taken in in is based on, and is adsorbed to nozzle member 8 is done.

[0035]

On the other hand, In the event of the electronic component that electronic component P adsorbed to nozzle member 8 is small as against nozzle member 8, it is emitted light the second luminescence department 22.

[0036]

When the second luminescence department 22 emits light, it transmits, and it is irradiated the first optical path length alteration department 23a of optical prism 23 the visible radiation by front side of an electronic component adsorbed to nozzle member 8 (FIG. 4 (a), lower surface). Then, Detection auxiliary member of framework 19 composes background of the electronic component. And, Visible radiation reflected back with an electronic component goes through optical prism 23 and optical lens 25, and it is received with line sensor 24. In other words, Front image of an electronic component adsorbed to nozzle member 8 is taken in to line sensor 24. And, Recognition of the electronic component which

image data to show front image set of this electronic component in is based on with image processing department 30, and is adsorbed to nozzle member 8 is done.

[0037]

In a place, While, with the mounting machine, component detecting unit 20 passes a point to arrange on of nozzle member 8, image of electronic component P adsorbed to nozzle member 8 with line sensor 24 is read, but, if, in doing so, it will be resembled it makes the orientation that is migration orientation and parallel of component detecting unit 20 do inflection by the first optical path length alteration department 23a of optical prism 23, and to take in image of an electronic component with line sensor 24, because it is done, it is compact, and component detecting unit 20 gets possible to be composed as compared to equipment of this conventional type.

[0038]

In other words, Dimension of top and bottom orientation of a mirror is necessary, and occupancy ship's space of a mirror is magnified so that a mirror installed at an angle of 45 degrees in lay going along the lower part of nozzle member is used, and it is necessary to project whole image of a widthwise direction of an electronic component adsorbed with the before equipment which it makes the orientation that is perpendicular to migration orientation of a component detecting unit (a widthwise direction) do inflection, and seem to take in image of an electronic component to a line sensor by nozzle member in lengthwise of a mirror (top and bottom orientation), as a result, extension stroke of nozzle member becomes big.

[0039]

However, If, with equipment of the embodiment, it will be resembled it makes the orientation that is migration orientation and parallel of component detecting unit 20 do inflection, and to take in image of an electronic component with line sensor 24, because it is done, if it is not had to convert whole image of a widthwise direction of an electronic component to top and bottom orientation of optical prism 23 like conventional embodiment, and application does can steal with optical prism 23 of the spreading dimension which can take in whole image of a widthwise direction of an electronic component, thickness of optical prism 23 can be set extremely thinly. Therefore, Top and bottom orientation occupancy space of optical prism 23 can be suppressed by this, it is more compact, and component detecting unit 20 can be composed as compared to conventional equipment, and it is small, and extension stroke of nozzle member 8 is done, a disposition time can be shortened.

[0040]

In addition, Though, in component recognition device of the embodiment, an electronic component adsorbed to nozzle member 8 by configuration or dimension of an electronic component are accepted, and changing light source is recognized like statement above, because pictorial image of drift which it wants to be suitable for namely projection image of an electronic component or front image is taken in for a select, and an electronic component can be recognized, as compared to the conventional equipment which only electronic component image of either is taken in, and recognized an electronic component, recognition of an electronic component gets possible to be done more surely, recognition accuracy of an electronic component can be raised by this.

[0041]

Even more particularly, In component recognition device of the embodiment, optical prism 23 is applied as optical path length changing means, because the second underneath luminescence department 22 of the first optical path length alteration department 23a of optical prism 23 is repeated like statement above by using a property of optical prism 23, and it is arranged on, optical prism 23 and the second luminescence department 22 can be put in a little ship's space, compactification of component detecting unit 20 can be planned by this. In particular, It is more compact, and component detecting unit 20 can be composed by holding down thickness of optical prism 23 like statement above as much as possible.

[0042]

In addition, The embodiment is an example of component recognition device concerning the present invention, and it is not limited to the embodiment, and the concrete framing can be changed appropriately.

[0043]

By way of example only, In the embodiment, optical prism 23 is configured from the second optical path length alteration department 23b making the orientation that is the level which is perpendicular to migration orientation of component detecting unit 20 mentioning the visible radiation that inflection did by the first optical path length alteration department 23a and this which make the orientation that is migration orientation and parallel of component detecting unit 20 mentioning the visible radiation that is incident on above from top do inflection above more do inflection, image of an electronic component becomes lead to line sensor 24 arranged on a side of component detecting unit 20, but, it is exchanged with such a framing, and, as shown in FIG. 5, optical lens 25 and line sensor 24 is arranged on one side end of migration orientation of component detecting unit 20, optical prism 31 to make only the orientation that is migration orientation and parallel of component detecting unit 20 (shown in a solid line arrow of figure) do inflection is applied to, and image of an electronic component seems to be led to line sensor 24, and the visible radiation that it is incident on by top may be composed.

[0044]

In addition, The second luminescence department 22 is established to component detecting unit 20 while the first luminescence department 18 is established to head body 7 of adsorption head 6 in the embodiment, configuration of an electronic component adsorbed to nozzle member 8 is accepted, and this is employed for a select, but, when it is not had to be always equipped with luminescence department of neither, and configuration of an electronic component to load to circuit board 3 can seem to recognize enough in pictorial image of either of projection image of an electronic component or front image, only the first luminescence department 18 or luminescence department of either of the second luminescence department 22 is equipped with, and framing of mounting airplane may be simplified.

[0045]

Even more particularly, In the embodiment, the first luminescence department 18 is made for head body 7 of adsorption head 6, but, it is at one, and, in cases to have room for ship's space, the first luminescence department 18 may be equipped with to component detecting unit 20.

[0046]

#### [EFFECT OF THE INVENTION]

As discussed above, Constant direction can be moved to, and the present invention equips a component detecting unit to a head body of adsorption head, because adsorption head moved a component detecting unit within course moved from component feed section by a component threaded mounting, and it made the orientation that was migration orientation and parallel of a component detecting unit do inflection, and, in the mounting airplane that took in image of an electronic component adsorbed by nozzle member to a light-receiving section, electronic component image was taken in to a light-receiving section, occupancy ship's space of optical path length changing means is controlled, and it is compact, and a component detecting unit can be composed.

[0047]

In addition, In this configuration, if detection auxiliary member of framework forming background of an electronic component at the time of luminescence of the second luminescence department is established while the luminescence department is composed from the second luminescence department irradiating visible radiation from front side of an electronic component adsorbed by the first luminescence department and nozzle member irradiating visible radiation from foraminous backing layer of an electronic component adsorbed by nozzle member, and the visible radiation is diffused at the time of luminescence of the first luminescence department ahead of the first luminescence department, configuration of an electronic component is accepted, and different electronic component image gets possible to be taken in for a select, recognition accuracy of an electronic component can be raised by this.

[0048]

Even more particularly, An optical prism is applied as the optical path length changing means, if the second luminescence department is arranged on lower classes of an optical prism, it is more compact,

and a component detecting unit can be composed.

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#### [BRIEF DESCRIPTION OF DRAWINGS]

##### [FIG. 1]

It is a schematic plan view showing an example of mounting machine based on component recognition device concerning the present invention.

##### [FIG. 2]

It is an enlarged front elevation of adsorption head in mounting machine.

##### [FIG. 3]

It is profile of adsorption head.

##### [FIG. 4]

Longitudinal section (b) (a) is IV - IV sectional drawing in figure showing a component detecting unit (a).

##### [FIG. 5]

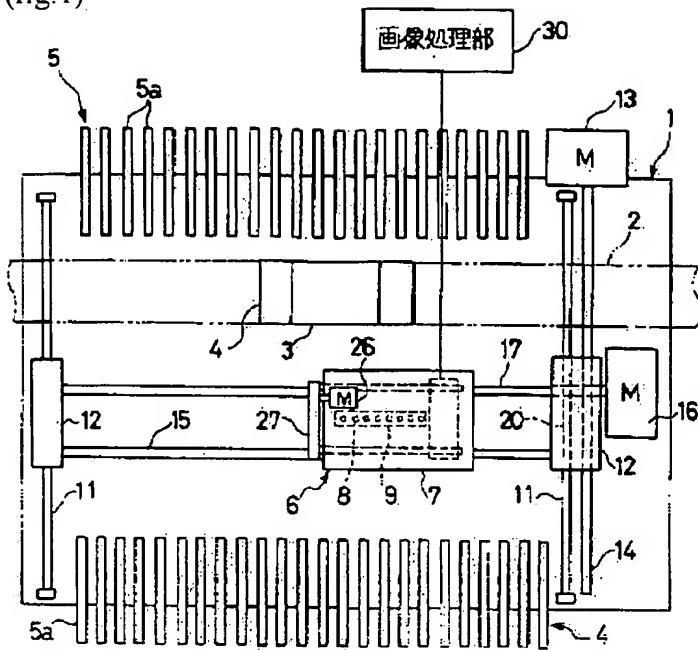
It is sectional drawing corresponding to FIG. 4 to show an example according to a *thing* of a component detecting unit (b).

#### [DENOTATION OF REFERENCE NUMERALS]

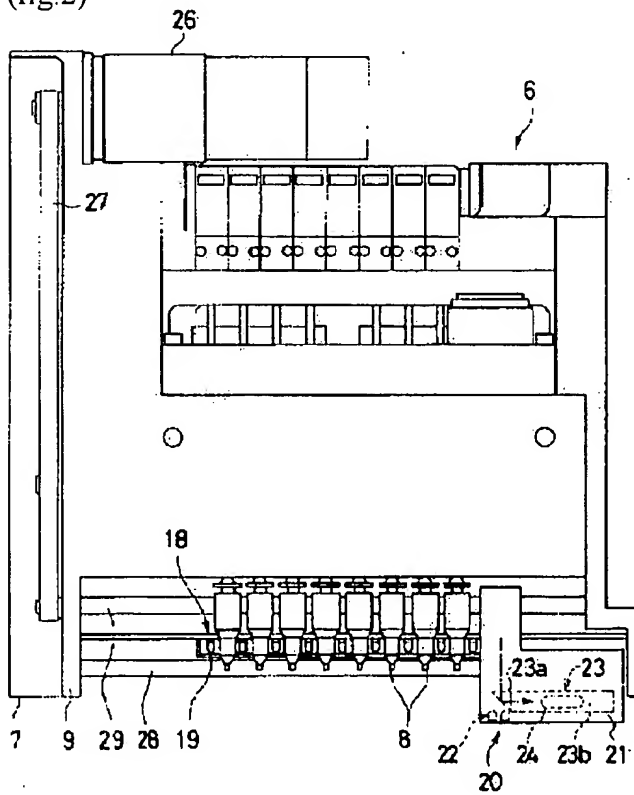
4 A component threaded mounting 5 Component feed section 6 Adsorption head 8 Nozzle member 18 The first luminescence department 19 Luminescence auxiliary member of framework 20 A component detecting unit 21 The main body of unit 22 The second luminescence department 23 An optical prism 23a The first optical path length modification department 23b The second optical path length modification department 24 A line sensor 25 An optical lens P An electronic component



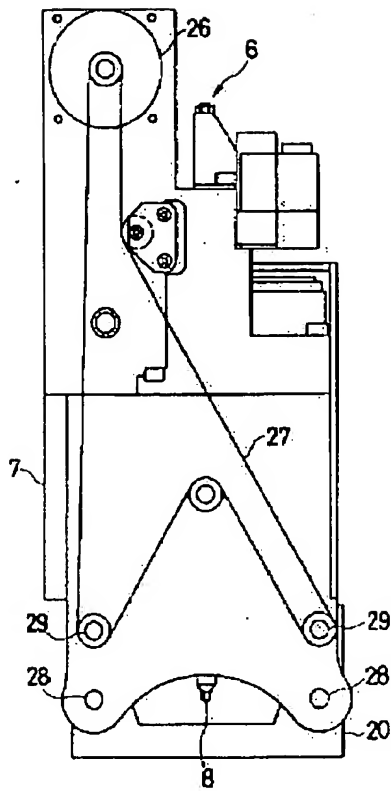
(fig.1)



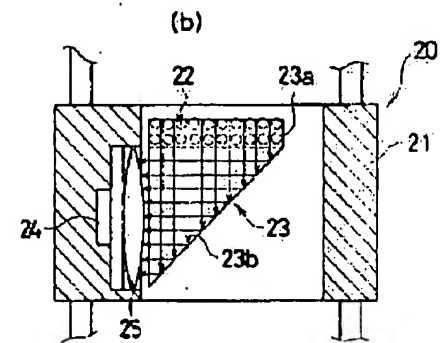
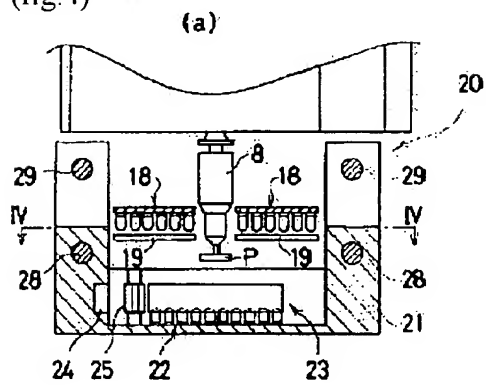
(fig.2)



(fig.3)



(fig.4)



(fig.5)

